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ABSTRACT

The relationship between gender and the race/geographic area of students and their Scholastic Aptitude Test (SAT) score gains after participation in one of two test preparatory programs was studied. Black (n=181) and native-born Appalachian white (n=67) high school juniors were selected on the basis of high scores on the California Achievement Test in 1986 or 1987 to participate in 2- or 3-week test preparatory programs during the summer after their junior year in high school. SAT pretest scores from no more than a few months before the program and posttest scores at the conclusion of the program were obtained. Junior and senior year scores were also available for some students who chose to participate and for some who were invited but declined the invitation. Modest to large gains were observed for the summer participants as a group, both between the junior and senior scores and between the pretest and posttest scores. Gains were larger or smaller depending on which test preparatory agency provided the training, whether the measure was for the mathematics or verbal portion of the SAT, and on the race/geographic areas and gender of the students. Participants had greater increases in their SAT mathematics scores between their junior and senior years than did non-participants; however, this was not true for SAT verbal scores. Twelve tables and four figures illustrate the study. (Author/SLD)

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Some Field Observations Concerning the Impact of Test Preparatory Programs on Scholastic Aptitude Test Scores

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Abstract

The research investigates the relationship between the gender and the race/geographic area of students and their Scholastic Aptitude Test score gains after participation in one of two test preparatory programs. Black and native-born Appalachian white high school juniors were selected on the basis of high scores on the California Achievement Test to participate in two- or three-week test preparatory programs during the summer after their junior year in high school. SAT pretest scores from no more than a few months before the program and posttest scores at the conclusion of the program were obtained. Junior and senior year scores were also available for some students who chose to participate and for some who were invited to attend but declined the invitation. Modest to large gains were observed for the summer participants as a group, both between the junior and senior scores and between the pretest and posttest scores. Gains were larger or smaller depending on which test preparatory agency provided the training, on whether the measure was for the Math or Verbal portion of the test, and on the race/geographic area and gender of the students. Participants in the program had greater increases in their SAT-M scores between their junior and senior years than nonparticipants; however, this was not the case for the SAT-V scores.

Some Field Observations Concerning the Impact of Test Preparatory Programs on Scholastic Aptitude Test Scores

The literature on the effectiveness of test preparatory programs in increasing students' scores on the Scholastic Aptitude Test (SAT) is extensive. The interest is understandable, since most selective colleges and universities in the United States weigh SAT scores heavily in their admissions decisions (Willingham & Breland, 1982 ; Wing, 1964; Wing & Wallach, 1971). The possibility that some students might have an advantage, not because of aptitude, but as a result of having had access to an effective test preparatory program, is of interest to the millions of students who yearly take the test, to college administrators, to parents wanting their children to have the best possible chance of being admitted to a prestigious university, and to politicians wanting to cast their administrations in the best possible light. As an example of this last group's interest, even President Reagan took credit for SAT score gain as one of the accomplishments of his administration in the early '80's (Zajonc, 1986).

The argument has been made, most notably by Slack and Porter (1980), that if scores on the SAT can be improved by test preparatory programs, then SAT scores cannot fairly be used in college acceptance decisions, as the scores would indicate not the students' aptitudes, but the effectiveness of the test preparatory programs they attended. The Educational Testing Service (ETS), the creator and distributor of the SAT, in a 1965 report asserted that test preparatory programs do not significantly improve test scores; specifically, "score gains directly attributable to coaching amount, on the average, to fewer than 10 points" (p. 4).

Numerous studies have examined the effects of test preparatory programs. Some (DerSimonian & Laird, 1983; French & Dear, 1959; Whitla, 1962) have concluded, as the ETS has, that test preparatory programs, whether short or long, have little influence on scores. Kulik, et al. (1984), in contrast, have found that some preparatory programs, particularly those with pretests and posttests immediately preceding and following the program, yield gains of about 50 points on the Math portion of the test (SAT-M) and similar gains on the Verbal portion (SAT-V). Various

explanations for the effectiveness of specific test preparatory programs have been advanced. Ligon (1983) suggests that test preparatory programs may increase the test-wiseness of the participants; test-wiseness he identifies with reduction of test anxiety, carelessness, confusion, and poor use of time. According to Ligon (1983) and Messick (1982), this increase in test-wiseness accounts for only the initial 10- or 15-point score improvement on each portion of the test that typically occurs soon after a test preparatory program begins. It should be noted that as standardized testing has become more frequent in our primary and secondary school systems, the test-wiseness effect is becoming less pronounced for most students. If, however, some students have unusually poor test-taking skills, they may stand to gain more than the average of 10 or 15 points found by Ligon (1983) and by Messick (1982). In fact, Sesnowitz, et al. (1982) conclude that the effectiveness of commercial test preparatory programs is attributable to the fact that these programs attract students with poor test-taking skills. By increasing the test-wiseness of these students, these programs enable the students to perform at their ability levels. This theory has several attractions: it explains why some test preparatory programs are more effective than others and it reconciles the effectiveness of these programs with the concern of ETS about score validity. It further suggests that, as Pike (1979) asserts, all students should receive some training in test-wiseness to allow them to perform at their level of ability.

Test preparatory programs vary widely in both emphasis and length. While much of the effectiveness of short programs may be attributable to an increase in test-wiseness, the effectiveness of longer programs, especially when gains continue to increase with time, is less easy to explain. Messick and Jungeblut (1981) have found that long programs, especially those approaching three hundred hours of instruction time, yield the greatest score increases. Part of this effectiveness may be due to an emphasis, by the longer programs, on content and on the development of thinking skills. Messick and Jungeblut (1981) found that the longer programs that yielded the greatest score increases had instruction time approaching 300 hundred hours. This explanation, too, has an appeal. If an improvement in thinking skills is responsible for the score increase and if an improvement in thinking skills can be considered an increase in aptitude, then the scores will continue to reflect the

aptitudes of the students. However, while the importance of providing training in thinking skills (e.g., how to approach, define, and solve problems) has been emphasized by investigators such as Anastasi (1981), who assert that such training may produce the largest gains for students from educationally-disadvantaged backgrounds, not all researchers agree that it is possible to improve an individual's thinking skills by training. Although Nesbit, et al. (1987) and Sternberg (1984) argue convincingly that thinking skills can be taught and Hernstein, Nickerson, de Sanchez, and Swets (1986) provide an example of a successful program to improve cognitive skills among Venezuelan students, Jensen (1984) argues that, to the contrary, there is little evidence that thinking skills can be improved or intelligence increased. A better understanding of the possibility and effectiveness of teaching thinking skills would help disentangle the various possible effects of test preparatory programs.

Beyond the questions of whether test preparatory programs are effective in increasing students' SAT scores and, if they are, why, there is an additional possibility: maybe some kinds of test preparatory programs are effective only for some kinds of students. For example, should females, who as a group tend to have less math experience than males, be expected to gain more than males on the Math SAT by participating in a test preparatory program? It may be that some studies which have found a small average score increase would yield significant results in some subgroups if the subjects were divided by race/geographic area, by gender, or by other characteristics.

The purpose of this study is to examine the impact that different test preparatory programs, different racial/geographic groups, and different genders have on the SAT Verbal and Math scores of high school students. The hypotheses are, as follows:

(a) the test preparatory programs will be positively associated with increases in the average SAT score;

(b) the effects of the test preparatory programs will not be uniform across racial/geographic groups or genders;

(c) the increase in scores within the test preparatory programs will be approximately the same whether gains are measured over the long term (between junior and senior years) or over the short term (between preparatory program pretest and posttest scores).

Method

Subjects

The Awards Committee for Education sponsored a test preparatory project during the summers of 1986 and 1987, financed by the Jessie Ball duPont Religious, Charitable and Educational Fund. This project employed two nationally-known test training agencies and was administered by and housed at Wake Forest University. In both 1986 and 1987, the Awards Committee for Education identified Black students in North Carolina who had scored in the 98th percentile or higher on math, verbal, or the total battery in a statewide administration of the California Achievement Test during the students' ninth year in school. White Appalachian students who lived in the mountainous counties of the state were also identified on the basis of scores on the same tests. Each summer, two test preparatory sessions were held at Wake Forest University during the middle of June or early July. In 1986 the sessions lasted two weeks; in 1987 the sessions lasted three weeks. All students were invited to attend, free of cost, one of the two sessions, either Group A or Group B, to be held in a given summer. In 1986 there were 61 students who attended the June session (Group A) and 72 students who attended the July session (Group B), for whom complete information is available as a basis for analyzing the impact of the test preparatory programs. From the students who attended in 1987, complete information is available for 64 from Group A and 51 from Group B. The June session of each summer has been designated Group A; the July session, Group B.

Procedure

The June and July sessions were conducted by two test preparation agencies, one for each session. In 1986, students were given one form of the SAT on the morning after they arrived on campus. The SAT was given as part of the institutional testing program of the Educational Testing Service It was administered, as is the general practice, by a school or college (in this case, Wake

Forest University), and was scored by ETS. In 1987, students were required to take the SAT in their junior year, prior to attending the program. This junior year score was used as a pretest score in place of the score from the specially-administered pretest of the 1986 groups. In referring to pretest scores, then, we mean the special pretest scores for the 1986 groups and the junior year scores for the 1987 groups.

On Monday through Friday of the first week of the program, students were tutored in small groups. During the weekends, students were not tutored, but participated in athletic, cultural, and recreational activities. The test preparatory program resumed on Monday and continued through Thursday of the second or third week. Through ETS' institutional testing program, a second form of the SAT was administered to the students on the second Friday morning of the 1986 sessions and on the third Friday in the 1987 program. Following the second administration, the students left to return home.

In addition to the data derived from pretest and posttest scores, another set of data was obtained. This consisted of scores students made on the SATs in their junior year (between December of 1985 and May of 1986, for 1986 students, and between December of 1986 and May of 1987, for 1987 students) prior to the summer programs; and the scores these same students made in their senior year, after the summer preparatory programs (between October of 1986 and February of 1987, for 1986 students, and between October of 1987 and February of 1988, for 1987 students). Students for whom these data are available include 78 participants from 1986 and 95 from 1987, as well as 80 students who were invited to participate, but declined the invitation.

Results

An overview of the main results may be obtained by examining the data pertinent to testing the hypotheses. For hypotheses (a) and (c), the average increase between the pretest and the posttest scores (the short-term result) was 26.37 points or 31.8 percent of the pretest standard deviation for SAT-V (Table 1) and 55.37 points or 63.8 percent of the pretest standard deviation for SAT-M (Table 3). The average increase between the junior year and senior year scores (the long-term result)

was 25.43 points or 30.7 percent of the junior year standard deviation on the SAT-V and 49.13 points or 56.5 percent of the junior year standard deviation on the SAT-M (Tables 5 and 7, respectively). In accordance with hypothesis (a), there was a general increase associated with the test preparatory programs. In accordance with hypothesis (c), the Verbal increase was about the same for short-term (26.37, Table 1) and long-term (25.43, Table 5) results. Hypothesis (c) is not confirmed in the case of the SAT-M, however, since the short-term increase (55.37, Table 3) was greater than the long-term increase (49.13, Table 7).

The most interesting results pertain to hypothesis (b), which states that the effects of test preparatory programs will not be uniform across racial/geographic groups and gender. Differences in effect are apparent in Tables 1, 3, 5, and 7, as discussed below.

In order to provide measures of both short-term and long-term results, the changes in scores between the pretest and the posttest (short-term results) and between the junior year and the senior year (long-term results) are examined separately. Tables 1 and 3 present short-term results for SAT-V and SAT-M, respectively, while Tables 5 and 7 present the corresponding long-term results.

Given the fact that it is impossible to know with any precision what general population is represented by the special population under study, and, given the small size in some of the subgroups, the presentation of results will focus on the mean score gains (posttest score minus pretest score or senior year score minus junior year score) in relation to the pretest or junior year standard deviations. This technique was also used by Kulik, et al. (1984).

The means, standard deviations, and numbers of subjects (n's) for the pre-preparation and post-preparation SAT-V scores for groups of subjects divided by gender, preparatory group, racial/geographic group, and year are presented in Table 1. The results of a five-way analysis of variance with repeated measures on the data in Table 1 is presented in Table 2.

Insert Tables 1 and 2 about here

The mean differences in the various categories in Table 1 reveal some differences between the data from 1986 and the data from 1987 and the five-way analysis of variance for repeated measures presented in Table 2 indicates that the year does relate significantly ($p < .05$) to pretest and posttest scores. Upon examination we find that the mean pretest score for 1986 participants is 496.17 points, whereas the mean pretest score for the 1987 participants is 471.65 points, approximately 24.5 points lower. The mean difference scores, however, are almost the same (27.14 points and 25.48 points, respectively). As we would expect then, the analysis of variance indicates that the interaction between the pretest-posttest and year gain is not significant.

Further examination of Table 2 reveals that race/geographic area has a significant effect on the pretest and posttest SAT-V scores ($p < .05$); however, there is no significant effect of race/geographic area on the pretest-posttest gain. The average pretest scores for Black participants and for Appalachian participants are very different (466.85 points and 533.28 points, respectively), but the mean gains are very similar (25.69 points and 28.21 points).

Some student characteristics interact significantly with pretest-posttest gains. The pretest to posttest gain by preparatory group by gender interaction is significant ($F(1,232) = 9.97$, $p < .05$), a finding which suggests that the magnitude of the gain is not uniform for the two genders. However, interpretation of this interaction is complicated by the presence of a significant pretest to posttest gain by preparatory group by race/geographic area by gender interaction (Figure 1; $F(1,232) = 5, 18$, $p < .05$).

Insert Figure 1 about here

To interpret this interaction, an exploration was made of the simple effects of race/geographic area within gender and preparatory group, of gender within preparatory group and racial/geographic group, and of preparatory group within race/geographic area and gender. Several significant simple effects were found. Appalachian females in Group A (mean difference = -1.76) had a significantly smaller score increase than Appalachian females in Group B (mean difference = 56.50; $F(1,35) =$

20.48, $p < .05$). Appalachian females in Group B (mean difference = 56.50) achieved a significantly greater increase than Black females in Group B (mean difference = 25.37; $F(1,72) = 9.46$, $p < .05$). Appalachian females in Group A (mean difference = -1.76) showed a significantly smaller increase than Appalachian males in Group A (mean difference = 34.67; $F(1,30) = 4.68$, $p < .05$). Also, the Appalachian females in Group B (mean difference = 56.50) increased their scores significantly more than the Appalachian males in Group B (mean difference = 18.00; $F(1,33) = 8.83$, $p < .05$).

The interaction among the pretest to posttest gain, preparatory group, racial/geographic group, and year approached significance ($F(1,232) = 3.81$, $p < .06$). An examination of the effects within this interaction revealed only two significant simple effects. The difference between the score improvement of Appalachian students in Group A in 1986 (mean difference = 14.70) and the score improvement of Appalachian students in Group B in 1986 (mean difference = 47.08) was significant ($F(1,39) = 5.19$, $p < .05$). Also significant was the difference between the score increase between the pretest and posttest of Appalachian students in Group B in 1986 (mean difference = 47.08) and the score increase of Black students in Group B in 1986 (mean difference =20.42; $F(1,70) = 5.83$, $p < .05$).

The pretest to posttest gain by race/geographic area by gender by year interaction also approached significance ($F(1,232) = 3.33$, $p < .07$). Analyses of the simple effects of race/geographic area within gender and year, of gender within race/geographic area and year, and of year within race/geographic area and gender were conducted. Four significant simple effects were found. Black females in 1986 (mean difference = 12.15) were found to have a significantly smaller increase in SAT-V from the pretest to the posttest than Black males in 1986 (mean difference = 39.27; $F(1,90) = 7.55$, $p < .05$). Black females in 1986 (mean difference = 12.15) were also found to have a significantly smaller score increase than Appalachian females in 1986 (mean difference = 42.38; $F(1,70) = 6.72$, $p < .05$). Black females in 1986 (mean difference = 12.15) improved significantly less than Black females in 1987 (mean difference = 30.37; $F(1,102) = 4.47$, $p < .05$). An almost significant difference was found between Appalachian females in 1986 (mean difference = 42.38) and Appalachian females in 1987 (mean difference = 13.13; $F(1,35) = 3.55$, $p < .07$).

Table 3 presents the means, standard deviations, and numbers of subjects for the pretest and posttest SAT-M scores for groups of subjects divided by gender, preparatory group, racial/geographic group, and year. Table 4 presents the corresponding five-way analysis of variance for repeated measures. Race/geographic area and gender both have significant effects ($p < .05$) on the pretest and posttest scores, since the average pretest score for males (542.24 points) is 43.16 points higher than the average for females (499.08 points); and the average pretest score for Appalachian participants (546.12 points) is 38.94 points above the average pretest score for Black participants (507.18 points). Neither race/geographic area nor gender, however, is significant when related to the pretest-posttest gain. Preparatory group, however, does have a significant effect at the .05 level.

Insert Tables 3 and 4 about here

The pretest to posttest gain by preparatory group by year interaction (Figure 2) is also significant ($F(1,232) = 13.27$, $p < .05$), a finding which suggests that the difference in the effectiveness of the two preparatory groups on the pretest-posttest gain differed for the two years. Analyses of the simple effects of preparatory group within year and the simple effects of year within preparatory group were then conducted. Two significant effects were found. Students in Group A in 1986 (mean difference = 83.78) were found to have a significantly larger increase in SAT-M scores from the pretest to the posttest than students in Group B in 1986 (mean difference = 41.94; $F(1,131) = 18.60$, $p < .05$). A significant difference was also found between students in Group A in 1986 (mean difference = 83.77) and students in Group A in 1987 (mean difference = 46.10; $F(1,123) = 15.03$, $p < .05$).

Insert Figure 2 about here

The tables presenting the results for the junior year and senior year scores parallel those for the pretest and posttest scores. Table 5 contains the means, standard deviations, and numbers of subjects for the junior year and senior year SAT-V scores for groups of subjects divided by gender, preparatory group, racial/geographic group, and year. Table 6 is the analysis of variance table for a five-way analysis of variance with repeated measures. Race/geographic area again related significantly ($p < .05$) to the junior year and senior year scores, and preparatory group approached significance in its relationship to the junior year to senior year gain.

Insert Tables 5 and 6 about here

Table 7 presents the means, standard deviations, and numbers of subjects for the junior year and senior year SAT-M scores for groups of subjects divided by gender, preparatory group, racial/geographic group, and year. Table 8 is the analysis of variance table for a five-way analysis of variance for repeated measures. Race/geographic area and gender again had significant effects on the junior year and senior year scores ($p < .05$) and race/geographic area and year both had significant effects on the junior year-senior year gain, again at a .05 level of confidence.

Insert Tables 7 and 8 about here

The short-term results do approximate the long-term results; that is, the improvement between the pretest and the posttest is almost equal to the improvement between the junior year and the senior year. This effect cannot be accounted for by an improvement between the junior year score and the pretest, because the 1986 pretest scores (496.17 for the SAT-V and 518.65 for the SAT-M) are roughly equal to the 1986 junior year scores (489.10 for the SAT-V and 530.39 for the SAT-M); and in 1987, the pretest score was the junior year score. It must be remembered, however, that year did relate significantly to the gain between the junior year and the senior year SAT-V scores and to the gain between the junior year and the senior year SAT-M scores. The difference scores are therefore

more comparable between the junior year/senior year and the pretest/posttest when the 1986 data and the 1987 data are combined than when either year is considered alone.

Finally, Tables 9 through 12 compare scores of participants in the program with scores of those who were invited to participate and chose not to, but who, nevertheless, provided junior year and senior year score information. Table 9 presents SAT-V means and standard deviations as well as the numbers of students in groups divided by gender, racial/geographic group, participation, and year. Table 10 presents a five-way analysis of variance with repeated measures for the data in Table 9. Table 11 parallels Table 9, but presents the information for SAT-M scores. Table 12 presents the five-way analysis of variance with repeated measures for the data in Table 11. Participation in the program was found to have a significant relation ($p < .05$) to improvement in SAT-M score but not to the improvement in SAT-V score. On the SAT-M, participants began with an average score far below that of non-participants (520.46 points vs. 544.58 points) and by the senior year test had surpassed the non-participants (570.06 points vs. 560.88 points).

Insert Tables 9 through 12 about here

The junior year to senior year Verbal score gain by gender by year interaction (Figure 3) is significant ($F(1,237) = 4.09$, $p < .05$). This result suggests that the relationship between gender and the junior year score to senior year score gain was not uniform for the two years. Analyses of the simple effects of gender within year and the simple effects of year within gender were then conducted. Two significant relationships were found. Males in 1986 (mean difference = 13.22) were found to have a significantly smaller increase in SAT-V from the junior year to the senior year than males in 1987 (mean difference = 40.95; $F(1,110) = 9.68$, $p < .05$). A significant difference was also found between males in 1987 (mean difference = 40.95) and females in 1987 (mean difference = 20.26; $F(1,128) = 5.65$, $p < .05$).

Insert Figure 3 about here

The junior year to senior year Math score gain by race/geographic area by participation interaction (Figure 4) approached significance ($F(1,237) = 3.30$, $p < .08$), a result that suggests that the relationship between race/geographic area and the junior year score to senior year score gain was not the same for participants and nonparticipants. Black participants (mean difference = 44.16) were found to have a significantly larger increase in SAT-M from the junior year to the senior year than Black nonparticipants (mean difference = 18.70; $F(1,182) = 10.77$, $p < .05$). Significant differences were also found between Appalachian participants (mean difference = 64.19) and Appalachian nonparticipants (mean difference = 11.92; $F(1,67) = 17.48$, $p < .05$) and between Appalachian participants (mean difference = 64.19) and Black participants (mean difference = 44.16; $F(1,171) = 5.42$, $p < .05$).

Insert Figure 4 about here

Discussion

Before these data are discussed, the following characteristics of the participating students should be noted: (1) they were invited to participate because they had previously scored high on the California Achievement Test and (2) they selected themselves to the extent that they chose to accept the Awards Committee's invitation to attend the sessions at Wake Forest. The total of 248 students for whom there is complete pretest and posttest information scored about 55 points higher than the average of all students taking the SAT-V in 1985-86. The Appalachian participants exceeded the average national score for white students by about 85 points. The Black participants exceeded the national average for black students by 120 points. The participants were, in short, above average in test scoring. Thus, one cannot say that these students represent the general population, or that results of this study may be assumed to apply to other groups.

These participants also appear to have come from families with above average socioeconomic circumstances. Such a finding would be expected on the basis of the fact that high test scores tend to be achieved by students from more advantaged socioeconomic circumstances. For the 1986 participants, both mothers and fathers of participants had relatively high levels of education. Slightly over 43 percent had B.A. or B.S. degrees plus some postgraduate work or a graduate degree. Only 8.3 percent of the fathers and 6.6 percent of the mothers had less than a high school diploma. The occupational level of the fathers tended to be relatively high, with 38 percent working in professional occupations requiring college degrees. Many of these fathers were in high-level management positions, or in professions requiring advanced degrees in law or medicine. Only 1.6 percent of the fathers held unskilled jobs. Most of the mothers were employed outside the home -- over 87 percent. Thirty-six percent of the mothers were employed in professional jobs, while only 3 percent were in unskilled employment. The average household income was estimated to be more than $30,000 a year. While the background data for the 1987 participants have not been analyzed, they can be assumed to be similar, as the selection procedures for the 1987 participants were the same as for the 1986 participants. These background data, like the test score data, suggest that the students participating in this study are not representative of the general population.

In previous studies of the impact of short-term test preparation on SAT score gains, modest score gains have usually been reported. Kulik et al. (1984) estimated that test preparation effects would generally raise SAT scores about 33 points. In this study for the Awards Committee for Education, the results totalled for all participants are unsurprisingly comparable to results reported in previous studies.

When students are grouped by gender, race/geographic area, and type of test preparation they received, the results of this study are at variance with those reported in the previous literature on test preparation and test scores. Here the results do hold surprises, for it appears that the overall gain confounds and obscures differences in score gains obtained by males and females, Black students and Appalachian students, participants in preparatory Groups A and B, and participants in 1986 and 1987. Notably, analyzing SAT-V scores for groups by gender, racial/geographic group, year, and

preparatory group shows substantial variability in the difference scores. The SAT-V score differences ranged from -10.00 (Appalachian Group A females in 1986) to plus 63.33 (Appalachian Group B females in 1986). While the group with the mean difference of -10.00 points included only 6 cases, and had the highest average pretest score, making improvement more difficult to achieve, the results do seem to suggest that Appalachian females tended to improve more as a result of the Group B test preparatory program than of the Group A test preparatory program.

It appears that the issue of test preparation impact on SAT-V score gains is intertwined with the type of preparatory program offered, with differences among the students being trained, and with whether the score gains are measured after a short or long period. These results suggest that the following factors are important in planning test preparatory programs: What are the demographic characteristics of the students to be trained? What will be the duration of the impact (short-term or long-term) of the training program?

Conclusion

Does a two- or three-week summer preparatory program produce gains in Scholastic Aptitude Test scores for students who have previously demonstrated above-average test scores and who come from homes with above-average socioeconomic circumstances? The answer seems to be, it depends. In some cases, the answer is yes; in others, maybe. The answer varies with the gender of the student, the racial/geographic background of the student, the year the program was offered, the preparatory agency, and the portion of the SAT -- Verbal or Mathematical.

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Table 1

Pretest and Posttest SAT-V Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Categories				Pretest		Posttest		
			n	M	SD	M	SD	Mean Diff.
Females								
Group A	Appalachian	1986	6	598.33	78.08	588.33	89.31	-10.00
		1987	11	530.91	71.90	533.64	54.27	2.73
	Black	1986	23	489.13	70.06	501.30	64.05	12.17
		1987	27	457.04	80.14	478.52	86.14	21.48
Group B	Appalachian	1986	15	530.67	75.35	594.00	73.95	63.33
		1987	5	478.00	92.03	514.00	87.35	36.00
	Black	1986	28	483.93	96.24	496.07	98.11	12.14
		1987	26	472.31	59.62	511.92	77.72	39.61
Males								
Group A	Appalachian	1986	11	531.82	98.47	560.00	102.08	28.18
		1987	4	522.50	108.74	575.00	124.50	52.50
	Black	1986	21	470.00	68.56	516.19	71.45	46.19
		1987	22	450.00	75.02	469.55	74.23	19.55
Group B	Appalachian	1986	9	551.11	57.54	571.11	60.51	20.00
		1987	6	508.33	64.63	523.33	51.25	15.00
	Black	1986	20	448.00	82.37	480.00	86.75	32.00
		1987	14	453.57	72.71	480.71	75.70	27.14
Subtotals								
Females			141	490.78	82.90	514.40	86.63	23.62
Males			107	476.92	82.87	506.92	85.41	30.00
Group A			125	485.84	84.47	507.84	83.91	22.00
Group B			123	483.74	81.82	514.55	88.31	30.81
Appalachian			67	533.28	80.08	561.49	79.76	28.21
Black			181	466.85	76.84	492.54	80.80	25.69
1986			133	496.17	87.13	523.31	89.25	27.14
1987			115	471.65	76.24	497.13	80.23	25.48
Total			248	484.80	83.01	511.17	86.01	26.37

Table 2

Anova Table for SAT-V Pretest and Posttest Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Source	df	SS	MS	F	PR >F
Between S					
Prep	1	10,147.86	10,147.86	0.89	0.348
Race/Geo	1	366,530.67	366,530.67	32.00	0.000
Gender	1	7,132.74	7,132.74	0.62	0.431
Year	1	67,158.21	67,158.21	5.86	0.016
PrepXRace/Geo	1	8,976.62	8,976.62	0.78	0.377
PrepXGender	1	100.40	100.40	0.01	0.926
Race/GeoXGender	1	3,145.14	3,145.14	0.27	0.601
PrepXYear	1	210.95	210.95	0.02	0.892
Race/GeoXYear	1	17,287.81	17,287.81	1.51	0.221
GenderXYear	1	8,486.45	8,486.45	0.74	0.390
PrepXRace/GeoXGender	1	10,809.67	10,809.67	0.94	0.332
PrepXRace/GeoXYear	1	18,859.81	18,859.81	1.65	0.201
PrepXGenderXYear	1	1,708.02	1,708.02	0.15	0.700
Race/GeoXGenderXYear	1	10,668.82	10,668.82	0.93	0.336
PrepXRace/GeoXGenderXYear	1	3,274.46	3,274.46	0.29	0.593
Error	232	2,656,993.70	11,452.56		
Within S					
Pre-Post	1	57,784.05	57,784.05	55.63	0.000
Pre-PostXPrep	1	1,734.87	1,734.87	1.67	0.198
Pre-PostXRace/Geo	1	2.15	2.15	0.00	0.964
Pre-PostXGender	1	1,315.99	1,315.99	1.27	0.262
Pre-PostXYear	1	33.00	33.00	0.03	0.859
Pre-PostXPrepXRace/Geo	1	807.40	807.40	0.78	0.379
Pre-PostXPrepXGender	1	10,357.38	10,357.38	9.97	0.002
Pre-PostXRace/GeoXGender	1	83.01	83.01	0.08	0.778
Pre-PostXPrepXYear	1	286.31	286.31	0.28	0.600
Pre-PostXRace/GeoXYear	1	0.11	0.11	0.00	0.992
Pre-PostXGenderXYear	1	390.34	390.34	0.38	0.541
Pre-PostXPrepXRace/GeoXGender	1	5,383.06	5,383.06	5.18	0.024
Pre-PostXPrepXRace/GeoXYear	1	3,952.52	3,952.52	3.81	0.052
Pre-PostXPrepXGenderXYear	1	68.24	68.24	0.07	0.798
Pre-PostXRace/GeoXGenderXYear	1	3,454.14	3,454.14	3.33	0.070
Pre-PostXPrepXRace/GeoXGenderXYear	1	16.76	16.76	0.02	0.899
Error(Pre-Post)	232	240,978.09	1,038.70		

Table 3

Pretest and Posttest SAT-M Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Categories				Pretest		Posttest		
			n	M	SD	M	SD	Mean Diff.
Females								
Group A	Appalachian	1986	6	475.00	32.71	573.33	30.11	98.33
		1987	11	570.91	90.38	603.64	79.16	32.73
	Black	1986	23	489.13	77.28	575.65	66.25	86.52
		1987	27	484.44	91.20	531.48	101.40	47.04
Group B	Appalachian	1986	15	537.33	62.62	587.33	63.52	50.00
		1987	5	508.00	77.27	600.00	60.00	92.00
	Black	1986	28	484.64	73.76	527.14	71.33	42.50
		1987	26	490.00	86.53	526.54	85.13	36.54
Males								
Group A	Appalachian	1986	11	529.09	88.14	620.91	79.30	91.82
		1987	4	585.00	92.56	647.50	92.51	62.50
	Black	1986	21	560.00	81.98	632.38	77.39	72.38
		1987	22	536.36	89.42	585.00	83.99	48.64
Group B	Appalachian	1986	9	588.89	87.38	634.44	73.67	45.55
		1987	6	566.67	82.87	645.00	79.69	78.33
	Black	1986	20	518.50	83.62	552.00	66.78	33.50
		1987	14	516.43	90.35	571.43	119.48	55.00
Subtotals								
Females			141	499.08	82.21	552.70	81.99	53.62
Males			107	542.24	86.90	599.91	88.12	57.67
Group A			125	521.44	89.54	585.92	87.46	64.48
Group B			123	513.90	84.07	560.00	86.36	46.10
Appalachian			67	546.12	81.50	610.30	71.58	64.18
Black			181	507.18	86.52	559.28	89.27	52.10
1986			133	518.65	82.35	579.77	78.04	61.12
1987			115	516.61	91.98	565.30	97.47	48.69
Total			248	517.70	86.78	573.07	87.70	55.37

Table 4

Anova Table for SAT-M Pretest and Posttest Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Source	df	SS	MS	F	PR >F
Between S					
Prep	1	6,998.63	6,998.63	0.59	0.443
Race/Geo	1	158,300.94	158,300.94	13.34	0.000
Gender	1	173,815.00	173,815.00	14.65	0.000
Year	1	2,256.82	2,256.82	0.19	0.663
PrepXRace/Geo	1	24,115.85	24,115.85	2.03	0.155
PrepXGender	1	1,201.95	1,201.95	0.10	0.751
Race/GeoXGender	1	0.41	0.41	0.00	0.995
PrepXYear	1	2,988.08	2,988.08	0.25	0.616
Race/GeoXYear	1	25,581.08	25,581.08	2.16	0.143
GenderXYear	1	770.39	770.39	0.06	0.799
PrepXRace/GeoXGender	1	7,020.90	7,020.90	0.59	0.443
PrepXRace/GeoXYear	1	47,503.84	47,503.84	4.00	0.047
PrepXGenderXYear	1	2,304.19	2,304.19	0.19	0.660
Race/GeoXGenderXYear	1	281.08	281.08	0.02	0.878
PrepXRace/GeoXGenderXYear	1	64.32	64.32	0.01	0.941
Error	232	2,753,281.71	11,867.59		
Within S					
Pre-Post	1	313,292.38	313,292.38	203.66	0.000
Pre-PostXPrep	1	3,752.38	3,752.38	2.44	0.120
Pre-PostXRace/Geo	1	5,515.60	5,515.60	3.59	0.060
Pre-PostXGender	1	1.41	1.41	0.00	0.976
Pre-PostXYear	1	1,521.67	1,521.67	0.99	0.321
Pre-PostXPrepXRace/Geo	1	1,508.71	1,508.71	0.98	0.323
Pre-PostXPrepXGender	1	124.01	124.01	0.08	0.777
Pre-PostXRace/GeoXGender	1	22.38	22.38	0.01	0.904
Pre-PostXPrepXYear	1	20,414.09	20,414.09	13.27	0.000
Pre-PostXRace/GeoXYear	1	250.87	250.87	0.16	0.687
Pre-PostXGenderXYear	1	1,632.64	1,632.64	1.06	0.304
Pre-PostXPrepXRace/GeoXGender	1	1,327.92	1,327.92	0.86	0.354
Pre-PostXPrepXRace/GeoXYear	1	2,734.25	2,734.25	1.78	0.184
Pre-PostXPrepXGenderXYear	1	377.51	377.51	0.25	0.621
Pre-PostXRace/GeoXGenderXYear	1	86.09	86.09	0.06	0.813
Pre-PostXPrepXRace/GeoXGenderXYear	1	1,083.06	1,083.06	0.70	0.402
Error(Pre-Post)	232	356,884.46	1,538.30		

Table 5

Junior Year and Senior Year SAT-V Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Categories			Junior Year			Senior Year		
			n	M	SD	M	SD	Mean Diff.
Females								
Group A	Appalachian	1986	3	580.00	65.57	566.67	70.24	-13.33
		1987	9	523.33	71.06	543.33	71.76	20.00
	Black	1986	17	488.24	92.42	491.18	88.31	2.94
		1987	23	462.17	82.74	479.57	79.63	17.40
Group B	Appalachian	1986	8	541.25	68.34	576.25	55.53	35.00
		1987	2	430.00	28.28	475.00	7.07	45.00
	Black	1986	15	457.33	96.91	493.33	109.65	36.00
		1987	21	476.19	64.22	505.24	73.39	29.05
Males								
Group A	Appalachian	1986	7	550.00	107.55	557.14	96.04	7.14
		1987	4	522.50	108.74	577.50	86.55	55.00
	Black	1986	13	460.00	52.12	476.15	63.97	16.15
		1987	18	470.56	60.83	509.44	60.73	38.88
Group B	Appalachian	1986	5	544.00	51.28	582.00	52.63	38.00
		1987	5	524.00	58.14	556.00	62.69	32.00
	Black	1986	10	437.00	107.71	448.00	72.23	11.00
		1987	13	456.92	74.54	506.92	88.26	50.00
Subtotals								
Females			98	483.98	83.76	505.51	84.96	21.53
Males			75	480.53	82.15	511.07	80.58	30.54
Group A			94	486.92	82.68	505.75	80.25	18.83
Group B			79	477.22	83.25	510.51	86.39	33.29
Appalachian			43	533.02	76.24	559.30	69.05	26.28
Black			130	465.77	78.27	490.92	80.25	25.15
1986			78	489.10	93.09	506.92	90.89	17.82
1987			95	477.05	73.44	508.74	76.20	31.69
Total			173	482.49	82.84	507.92	82.90	25.43

Table 6

Anova Table for SAT-V Junior Year and Senior Year Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Source	df	SS	MS	F	PR >F
Between S					
Prep	1	12,911.44	12,911.44	1.17	0.282
Race/Geo	1	222,419.41	222,419.41	20.10	0.000
Gender	1	1,660.66	1,660.66	0.15	0.699
Year	1	11,061.51	11,061.51	1.00	0.319
PrepXRace/Geo	1	3,850.21	3,850.21	0.35	0.556
PrepXGender	1	2,599.88	2,599.88	0.23	0.629
Race/GeoXGender	1	14,763.66	14,763.66	1.33	0.250
PrepXYear	1	965.85	965.85	0.09	0.768
Race/GeoXYear	1	44,574.24	44,574.24	4.03	0.047
GenderXYear	1	28,499.80	28,499.80	2.58	0.111
PrepXRace/GeoXGender	1	15,030.24	15,030.24	1.36	0.246
PrepXRace/GeoXYear	1	15,808.47	15,808.47	1.43	0.234
PrepXGenderXYear	1	758.92	758.92	0.07	0.794
Race/GeoXGenderXYear	1	2,521.88	2,521.88	0.23	0.634
PrepXRace/GeoXGenderXYear	1	3,380.80	3,380.80	0.31	0.581
Error	157	2,118,391.94	13,492.94		
Within S					
Jr-Sr	1	36,971.05	36,971.05	27.44	0.000
Jr-SrXPrep	1	3,640.22	3,640.22	2.70	0.102
Jr-SrXRace/Geo	1	63.29	63.29	0.05	0.829
Jr-SrXPrepXRace/Geo	1	194.98	194.98	0.14	0.704
Jr-SrXGender	1	1,213.65	1,213.65	0.90	0.344
Jr-SrXPrepXGender	1	2,274.58	2,274.58	1.69	0.196
Jr-SrXRace/GeoXGender	1	45.94	45.94	0.03	0.854
Jr-SrXPrepXRace/GeoXGender	1	149.45	149.45	0.11	0.740
Jr-SrXYear	1	4,992.39	4,992.39	3.71	0.056
Jr-SrXPrepXYear	1	1,418.99	1,418.99	1.05	0.306
Jr-SrXRace/GeoXYear	1	53.31	53.31	0.04	0.843
Jr-SrXPrepXRace/GeoXYear	1	1,086.89	1,086.89	0.81	0.371
Jr-SrXGenderXYear	1	582.79	582.79	0.43	0.512
Jr-SrXPrepXGenderXYear	1	10.68	10.68	0.01	0.929
Jr-SrXRace/GeoXGenderXYear	1	649.84	649.84	0.48	0.488
Jr-SrXPrepXRace/GeoXGenderXYear	1	973.51	973.51	0.72	0.397
Error(Jr-Sr)	157	211,516.18	1,347.24		

Table 7

Junior Year and Senior Year SAT-M Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Categories			Junior Year		Senior Year		
			n	M	SD	M	SD	Mean Diff.
Females								
Group A	Appalachian	1986	3	496.67	80.83	543.33	66.58	46.66
		1987	9	552.22	89.69	593.33	78.10	41.11
	Black	1986	17	521.77	83.08	555.29	83.00	33.52
		1987	23	480.44	95.89	537.83	94.82	57.39
Group B	Appalachian	1986	8	552.50	29.16	613.75	50.41	61.25
		1987	2	480.00	42.43	550.00	141.42	70.00
	Black	1986	15	484.00	50.40	522.00	76.46	38.00
		1987	21	479.05	87.23	529.52	83.81	50.47
Males								
Group A	Appalachian	1986	7	547.14	116.01	628.57	77.12	81.43
		1987	4	585.00	92.56	667.50	94.30	82.50
	Black	1986	13	556.15	87.61	596.15	56.94	40.00
		1987	18	545.00	86.11	582.78	84.28	37.78
Group B	Appalachian	1986	5	608.00	44.39	648.00	30.33	40.00
		1987	5	568.00	92.57	672.00	43.82	104.00
	Black	1986	10	523.00	54.38	551.00	59.71	28.00
		1987	13	516.92	94.02	573.85	95.35	56.93
Subtotals								
Females			98	500.82	82.67	548.37	84.92	47.55
Males			75	547.20	85.80	598.40	80.05	51.20
Group A			94	527.55	93.14	575.43	86.34	47.88
Group B			79	513.04	78.71	563.67	86.29	50.63
Appalachian			43	555.58	80.81	619.77	74.05	64.19
Black			130	509.46	86.09	553.62	83.92	44.16
1986			78	530.39	76.83	573.21	76.52	42.82
1987			95	513.16	94.07	567.47	93.84	54.31
Total			173	520.93	86.91	570.06	86.27	49.13

Table 8

Anova Table for SAT-M Junior Year and Senior Year Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Source	df	SS	MS	F	PR >F
Between S					
Prep	1	2,894.56	2,894.56	0.24	0.625
Race/Geo	1	118,162.46	118,162.46	9.78	0.002
Gender	1	161,157.55	161,157.55	13.34	0.000
Year	1	240.53	240.53	0.02	0.888
PrepXRace/Geo	1	15,780.07	15,780.07	1.31	0.255
PrepXGender	1	106.21	106.21	0.01	0.925
Race/GeoXGender	1	9,009.27	9,009.27	0.75	0.389
PrepXYear	1	11,260.81	11,260.81	0.93	0.336
Race/GeoXYear	1	1,852.95	1,852.95	0.15	0.696
GenderXYear	1	4,100.19	4,100.19	0.34	0.561
PrepXRace/GeoXGender	1	1,758.88	1,758.88	0.15	0.703
PrepXRace/GeoXYear	1	40,027.82	40,027.82	3.31	0.071
PrepXGenderXYear	1	3,481.15	3,481.15	0.29	0.592
Race/GeoXGenderXYear	1	387.35	387.35	0.03	0.858
PrepXRace/GeoXGenderXYear	1	5,985.76	5,985.76	0.50	0.483
Error	157	1,897,375.43	12,085.19		
Within S					
Jr-Sr	1	158,116.22	158,116.22	131.96	0.000
Jr-SrXPrep	1	167.01	167.01	0.14	0.709
Jr-SrXRace/Geo	1	7,154.22	7,154.22	5.97	0.016
Jr-SrXGender	1	1,091.48	1,091.48	0.91	0.341
Jr-SrXYear	1	3,609.48	3,609.48	3.01	0.085
Jr-SrXPrepXRace/Geo	1	74.33	74.33	0.06	0.804
Jr-SrXPrepXGender	1	606.21	606.21	0.51	0.478
Jr-SrXRace/GeoXGender	1	2,334.45	2,334.45	1.95	0.165
Jr-SrXPrepXYear	1	1,969.56	1,969.56	1.64	0.202
Jr-SrXRace/GeoXYear	1	5.92	5.92	0.00	0.945
Jr-SrXGenderXYear	1	571.33	571.33	0.48	0.491
Jr-SrXPrepXRace/GeoXGender	1	1,115.36	1,115.36	0.93	0.336
Jr-SrXPrepXRace/GeoXYear	1	691.57	691.57	0.58	0.449
Jr-SrXPrepXGenderXYear	1	1,739.54	1,739.54	1.45	0.230
Jr-SrXRace/GeoXGenderXYear	1	1,070.70	1,070.70	0.89	0.346
Jr-SrXPrepXRace/GeoXGenderXYear	1	7.77	7.77	0.01	0.936
Error(Jr-Sr)	157	188,119.38	1,198.21		

Table 9

Junior Year and Senior Year SAT-V Score Means, Standard Deviations, and Number of Participants and Nonparticipants by Race/Geographic Area, Gender, Preparatory Group, and Year

Categories			Junior Year		Senior Year		
		n	M	SD	M	SD	Mean Diff.
Females							
Appalachian	Participants	22	529.09	72.83	552.27	65.68	23.18
	Nonparticipants	16	513.75	98.92	544.38	86.95	30.63
Black	Participants	76	470.92	82.58	491.97	85.45	21.05
	Nonparticipants	27	465.56	63.99	485.93	73.34	20.37
Males							
Appalachian	Participants	21	537.14	81.25	566.67	73.30	29.53
	Nonparticipants	10	503.00	93.81	542.00	101.41	39.00
Black	Participants	54	458.52	71.89	489.44	73.06	30.92
	Nonparticipants	27	497.41	74.66	507.41	83.79	10.00
Subtotals							
Females	Participants	98	483.98	83.76	505.51	84.96	21.53
	Nonparticipants	43	483.49	81.15	507.67	82.75	24.18
Males	Participants	75	480.53	82.15	511.07	80.58	30.54
	Nonparticipants	37	498.92	78.94	516.76	88.79	17.84
Appalachian	Participants	43	533.02	76.24	559.30	69.05	26.28
	Nonparticipants	26	509.62	95.23	543.46	90.77	33.84
Black	Participants	130	465.77	78.27	490.92	80.25	25.15
	Nonparticipant	54	481.48	70.72	496.67	78.74	15.19
Participants		173	482.49	82.84	507.92	82.90	25.43
Nonparticipants		80	490.63	80.01	511.88	85.17	21.25
Total		253	485.06	81.89	509.17	83.47	24.11

Table 10

Anova Table for SAT-V Junior Year and Senior Year Scores by Race/Geographic Area, Gender, and Participation

Source	df	SS	MS	F	PR >F
Between S					
Race/Geo	1	245,433.97	245,433.97	21.95	0.000
Gender	1	3,151.51	3,151.51	0.28	0.596
Participation	1	1,854.65	1,854.65	0.17	0.684
Race/GeoXGender	1	1,170.26	1,170.26	0.10	0.747
Race/GeoXParticipation	1	22,490.71	22,490.71	2.01	0.157
GenderXParticipation	1	1,479.16	1,479.16	0.13	0.716
Race/GeoXGenderXParticipation	1	14,920.00	14,920.00	1.33	0.249
Error	245	2,740,050.99	11,183.88		
Within S					
Jr-Sr	1	57,972.50	57,972.50	43.99	0.000
Jr-SrX Race/Geo	1	2,212.05	2,212.05	1.68	0.196
Jr-SrXGender	1	279.81	279.81	0.21	0.645
Jr-SrXParticipation	1	30.42	30.42	0.02	0.879
Jr-SrXRace/GeoXGender	1	320.31	320.31	0.24	0.623
Jr-SrXRace/GeoXParticipation	1	2,054.07	2,054.07	1.56	0.213
Jr-SrXGenderXParticipation	1	458.91	458.91	0.35	0.556
Jr-SrXRace/GeoXGenderXParticipation	1	686.71	686.71	0.52	0.471
Error (Jr-Sr)	245	322,911.03	1,318.00		

Table 11

Junior Year and Senior Year SAT-M Score Means, Standard Deviations, and Number of Participants and Nonparticipants by Race/Geographic Area, Gender, and Preparatory Group

Categories		Junior Year			Senior Year		
		n	M	SD	M	SD	Mean Diff.
Females							
Appalachian	Participants	22	538.18	69.19	590.00	72.31	51.92
	Nonparticipants	16	562.50	70.95	565.00	65.73	2.50
Black	Participants	76	490.00	83.49	536.32	84.90	46.32
	Nonparticipants	27	529.26	74.83	535.93	56.04	6.67
Males							
Appalachian	Participants	21	573.81	89.47	650.95	63.47	77.14
	Nonparticipants	10	562.00	93.90	589.00	84.12	27.00
Black	Participants	54	536.85	82.87	577.96	76.86	41.11
	Nonparticipants	27	542.22	75.41	572.96	70.97	30.74
Subtotals							
Females	Participants	98	500.82	82.67	548.37	84.92	47.55
	Nonparticipants	43	541.63	74.35	546.74	60.74	5.11
Males	Participants	75	547.20	85.80	598.40	80.05	51.20
	Nonparticipants	37	547.57	79.94	577.30	73.89	29.73
Appalachian	Participants	43	555.58	80.81	619.77	74.05	64.19
	Nonparticipants	26	562.31	78.70	574.23	72.67	11.92
Black	Participants	130	509.46	86.09	553.62	83.92	44.16
	Nonparticipants	54	535.74	74.70	554.44	66.04	18.70
Participants		173	520.93	86.91	570.06	86.27	49.13
Nonparticipants		80	544.38	76.55	560.88	68.44	16.50
Totals		253	528.34	84.33	567.15	81.03	38.81

Table 12

Anova Table for SAT-M Junior Year and Senior Year Scores by Race/Geographic Area, Gender, and Participation

Source	df	SS	MS	F	PR >F
Between S					
Race/Geo	1	132,934.00	132,934.00	12.08	0.001
Gender	1	92,525.19	92,525.19	8.41	0.004
Participation	1	1,714.97	1,714.97	0.16	0.693
Race/GeoXGender	1	469.46	469.46	0.04	0.837
Race/GeoXParticipation	1	17,884.13	17,884.13	1.62	0.204
GenderXParticipation	1	17,228.16	17,228.16	1.57	0.212
Race/GeoXGenderXParticipation	1	1,654.82	1,654.82	0.15	0.699
Error	245	2,696,852.90	11,007.56		
Within S					
Jr-Sr	1	111,058.55	111,058.55	95.82	0.000
Jr-SrXRace/Geo	1	1,564.74	1,564.74	1.35	0.246
Jr-SrXGender	1	6,529.98	6,529.98	5.63	0.018
Jr-SrXParticipation	1	30,920.21	30,920.21	26.68	0.000
Jr-SrXRace/GeoXGender	1	1,326.00	1,326.00	1.14	0.286
Jr-SrXRace/GeoXParticipation	1	3,382.65	3,382.65	2.92	0.089
Jr-SrXGenderXParticipation	1	1,120.37	1,120.37	0.97	0.327
Jr-SrXRace/GeoXGenderXParticipation	1	1,254.02	1,254.02	1.08	0.299
Error (Jr-Sr)	245	283,976.39	1,159.09		

Tables

Table 1 Pretest and Posttest SAT-V Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 2 Anova Table for SAT-V Pretest and Posttest Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 3 Pretest and Posttest SAT-M Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 4 Anova Table for SAT-M Pretest and Posttest Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 5 Junior Year and Senior Year SAT-V Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 6 Anova Table for SAT-V Junior Year and Senior Year Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 7 Junior Year and Senior Year SAT-M Score Means, Standard Deviations, and Number of Participants by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 8 Anova Table for SAT-M Junior Year and Senior Year Scores by Race/Geographic Area, Gender, Preparatory Group, and Year

Table 9 Junior Year and Senior Year SAT-V Score Means, Standard Deviations, and Number of Participants and Nonparticipants by Race/Geographic Area, Gender, and Preparatory Group

Table 10 Anova Table for SAT-V Junior Year and Senior Year Scores by Race/Geographic Area, Gender, and Participation

Table 11 Junior Year and Senior Year SAT-M Score Means, Standard Deviations, and Number of Participants and Nonparticipants by Race/Geographic Area, Gender, and Preparatory Group

Table 12 Anova Table for SAT-M Junior Year and Senior Year Scores by Race/Geographic Area, Gender, and Participation

Figure Captions

Figure 1. SAT-V pretest to posttest gain by preparatory group by racial/geographic group by gender.

Figure 2. SAT-M pretest to posttest gain by preparatory group by year.

Figure 3. SAT-V junior year to senior year gain by gender by year.

Figure 4. SAT-M junior year to senior year gain by racial/geographic group by participation.

Figure 1

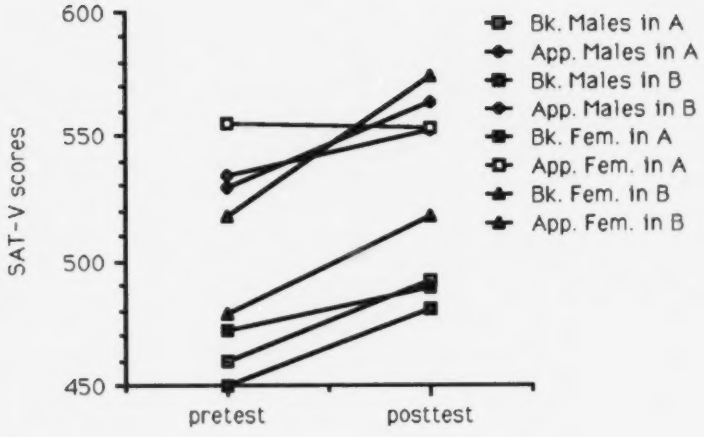

600
550
500
450
SAT-V scores
pretest
posttest
Bk. Males in A
App. Males in A
Bk. Males in B
App. Males in B
Bk. Fem. in A
App. Fem. in A
Bk. Fem. in B
App. Fem. in B

Figure 2

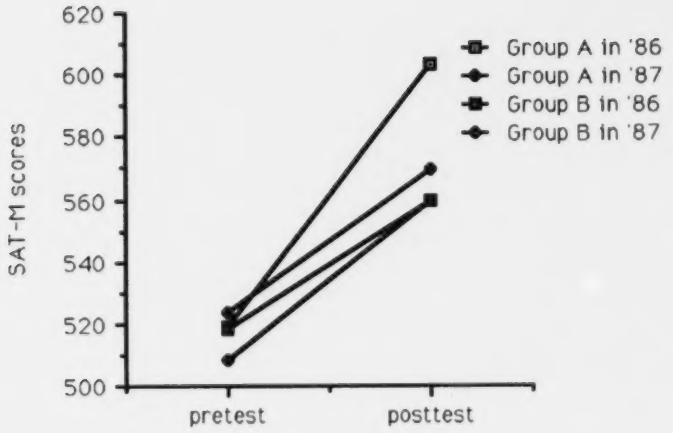

620
600
580
560
540
520
500
SAT-M scores
pretest
posttest
Group A in '86
Group A in '87
Group B in '86
Group B in '87

Figure 3

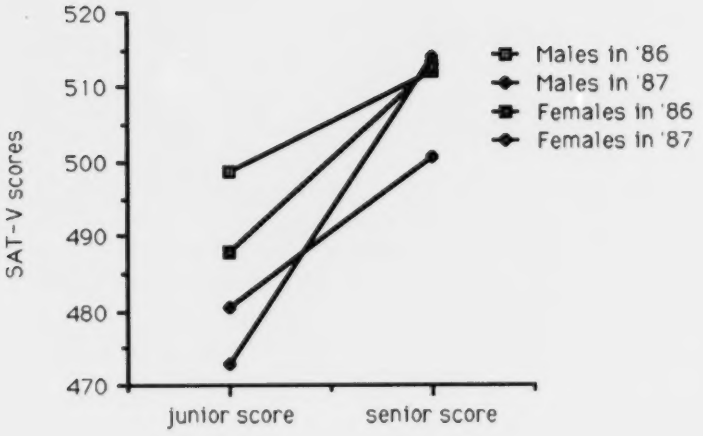
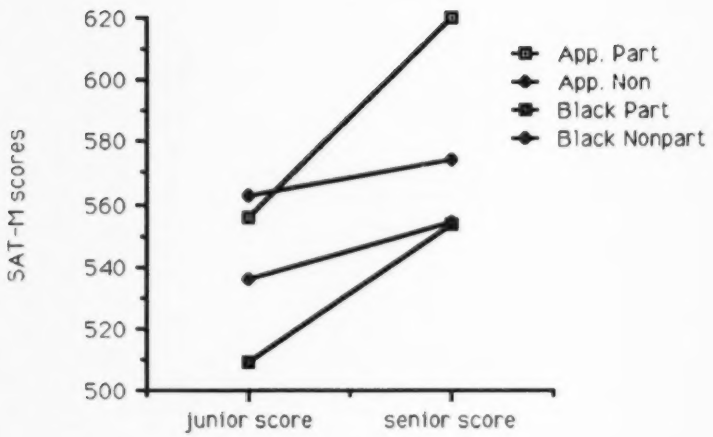

520
510
500
490
480
470
SAT-V scores
junior score
senior score
Males in '86
Males in '87
Females in '86
Females in '87

Figure 4


620
600
580
560
540
520
500
SAT-M scores
junior score
senior score
App. Part
App. Non
Black Part
Black Nonpart